

Optimality in a Single Cell

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Short Abstract — Stochasticity in gene expression and in other cellular components results in substantial variation within clonal cell populations. Such variation has been speculated to be advantageous in fluctuating environments, where it allows subsets of a population to be well-adapted to unpredictable changes in environment. In a constant environment, however, variation would result in cells being non-optimal. Here, we investigate a basic underlying open issue: does the noise in the expression of an essential carbon degrading enzyme influence the growth speed of single cells? We address this issue by means of time-lapse microscopy, where we determine both the growth rate of and the protein expression in individual *E. coli* cells.

Keywords — noise, stochastic gene expression, physiological adaptation, optimality, fitness.

I. EXTENDED ABSTRACT

E^{TENDED} abstract will be submitted later.

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